What is claimed is:

1. A stepper motor control system comprising:

comparator circuitry to compare a motor phase current with a reference current and provide an output; and

a motor current controller coupled to the comparator circuitry and a motor phase to adjust the motor phase current in response to the output, wherein the motor current controller selectively uses slow and fast current decay on the motor phase to reduce the motor phase current.

2. The stepper motor control system of claim 1 wherein the motor current controller decreases the motor phase current to the reference current using the fast current decay and switches to the slow current decay following a defined time period.

3. The stepper motor control system of claim 2 wherein the defined time period is equal to twice an elapsed time required to reduce the motor phase current to the reference current.

4. The stepper motor control system of claim 2 wherein the motor current controller decreases the motor phase current using only the fast current decay if the reference current is zero.

5. A stepper motor control system comprising:

a sine wave reference generator;

a cosine wave reference generator;

comparator circuitry to compare a first motor phase current with a sine wave reference current, and compare a second motor phase current with a cosine wave reference current; and

a motor current controller coupled to the comparator circuitry and first and second motor phases to adjust the first and second motor phase currents, wherein the motor current controller increases the first and second motor phase currents to follow an increasing sine wave or cosine wave reference current, and selectively uses slow and fast current decay on the motor phase to reduce the motor phase current to follow a decreasing sine wave or cosine wave reference current.

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6. The stepper motor control system of claim 5 wherein the motor current controller decreases the motor phase current to the reference current using the fast current decay and switches to the slow current decay following a defined time period, wherein the defined time period is equal to twice an elapsed time required to reduce the motor phase current to the reference current.

7. The stepper motor control system of claim 5 wherein the first motor phase current is measured using a resistor coupled in series with a winding of the first motor phase and a differential amplifier.

8. The stepper motor control system of claim 5 wherein the second motor phase current is measured using a resistor coupled in series with a winding of the second motor phase and a differential amplifier.

9. The stepper motor control system of claim 5 wherein the first motor phase current is measured using a resistor coupled to a winding of the first motor phase.

10. The stepper motor control system of claim 5 wherein the second motor phase current is measured using a resistor coupled to a winding of the second motor phase and a differential amplifier.

11. A stepper motor control system comprising:

a sine wave reference generator;

a cosine wave reference generator;

comparator circuitry to compare a first motor phase current with a sine wave reference current, and compare a second motor phase current with a cosine wave reference current; and

a motor current controller coupled to the comparator circuitry and first and second motor phases to adjust the first and second motor phase currents, wherein the motor current controller increases the first and second motor phase currents to follow an increasing sine wave or cosine wave reference current, and wherein the motor current controller decreases the motor phase current to follow a decreasing sine wave or cosine wave reference current using the fast current decay and switches to the slow current decay following a defined time period, wherein the defined time period is equal to twice an elapsed time required to reduce the motor phase current to the reference current.

12. A method of operating a stepper motor comprising:

comparing a motor phase current to a reference current; and

when the motor phase current is greater than the reference current, reducing the motor phase current to the reference current using a fast current decay process until the motor phase current is below the reference current, further reducing the motor phase current using a slow current decay process.

13. The method of claim 12 further comprising:

when the motor phase current is lower than the reference current, increasing the motor phase current to the reference current; and

reducing the motor phase current using the slow current decay process after the motor phase current reaches the reference current.

14. The method of claim 12 further comprising:

when the reference current equals zero, reducing the motor phase current using the fast current decay process.

15. A method of operating a stepper motor comprising:

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comparing a first motor phase current to a first reference current that is following a decreasing slope of a sinusoidal waveform;

when the first motor phase current is greater than the first reference current, reducing the first motor phase current to the first reference current using a fast current decay process until the first motor phase current equals the first reference current;

measuring a first time period required to decrease the first motor phase current to equal the first reference current;

further applying the fast current decay process for a second time period equal to the measured first time period; and

further reducing the first motor phase current using a slow current decay process following the second time period.

16. The method of claim 15 further comprises:

comparing a second motor phase current to a second reference current that is following an increasing slope of a sinusoidal waveform;

when the second motor phase current is less than the second reference current, increasing the second motor phase current until it is equal to the second reference current; and

reducing the second motor phase current using a slow current decay process after the second motor phase current is equal to the second reference current.

17. The method of claim 15 further comprises:

when the first motor phase current is less than the first reference current, increasing the first motor phase current until it is equal to the first reference current; and

reducing the first motor phase current using a slow current decay process after the first motor phase current is equal to the first reference current.

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18. The method of claim 15 wherein the first reference current equals zero, further comprises reducing the first motor phase current using a fast current decay process.

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